Preparing Future Teachers for Future Textbooks:

Terence W. Cavanaugh
University of North Florida, Jacksonville, Florida

The future for PK-12 textbooks appears to be digital. Already a number of states and school systems have begun the shift to digital textbooks. As such teacher education programs need to begin integrating digital textbooks into their curriculum. Integrating open source digital textbooks for teacher candidates can be a cost effective strategy as well a preparatory activity for future classroom design.

Introduction

The future of textbooks appears digital. If you have been following the trials and tribulations of textbooks, you may know that a number of states already require at least a digital component to their textbooks, and some states are moving from the physical printed textbook to that of an open source digital textbook. The awareness of digital versions of textbooks seems to be correlated to age, with college students being more aware of digital book files and tools than their professors (Rowland et al 2007, Levine-Clark 2007).

The National Council for the Accreditation of Teacher Education (NCATE) states that teachers must recognize that information is available from sources that go well beyond textbooks, but they also accept that for many teachers, a large part of what teachers do involves assisting students acquire information from textbooks and acting as an additional source of expertise (Wise 2001). The International Society for Technology in Education (ISTE) has refreshed their national standards for teacher competencies in technology use, which are adopted by NCATE.

Within these standards is the statement that teachers should "design or adapt relevant learning experiences that incorporate digital tools and resources to promote learning" (ISTE 2008, 2. Design and Develop Digital-Age Learning Experiences and Assessments). That approach also matches well with the International Reading Associations position that teacher preparation programs provide experiences for teacher candidates in technology enriched teaching throughout their program to prepare teachers to use technology and that programs should infuse information and communication technologies to ensure that future teachers use such for instruction (IRA 2009). While these statements may not directly promote the use of digital text, digital textbooks do fit the description as being a digital information and communication tool.
Technology and Teacher Education

Technology changes the classroom and what teachers and students do. This is not just high tech technology like laptop computers, but any technology, from the printing press, ball point pens, air conditioning, lighting, all can impact and change the educational situation. NCATE (2001) has five area standards focused on use of technology, including experiences and expectations for the use of technology by teacher candidates and faculty, for example Standard IV.B states that candidates (and faculty) have training and access to educational related electronic information.

According to the National Center for Educational Statistics (NCES), since the fall of 2003, nearly 100% of public schools have access to internet resources, with 93% of the classrooms having internet access (NCES 2005). Computer technology has been making dramatic changes in education, but it is not enough just to have the presence of the technology, but though integration that it makes an impact on the educational situation (Kellner 2005).

Today’s students use technology as a tool or a support, becoming more active rather than the passive in processing information transmitted by a teacher, textbook, or broadcast. The ways that a student can make choices about manipulating or displaying their digital textbook, makes the activity that much more active than just looking at the book.

This means that the teacher's role is changing too. Today’s teacher may no longer the center of attention as the dispenser of information, instead he or she acts as a facilitator, setting goals, providing guidelines and resources, moving from student to student and group to group. From the available 2003 data 78% of all elementary and secondary students were using computers to complete their school assignments (NCES 2008a), with 68% using computers not only at school but also at home (NCES 2008b).

Modern technology is constantly changing how today’s student is acting and learning. It is important for teachers and teacher preparation programs to adapt to the student’s learning processes and begin to integrate their native technologies into our education programs.

Digital Textbooks and Resources

The textbook as a digital resource is something that many of our students are already aware of, but may lack experience with, so teacher education programs need to begin integrating digital textbooks. The experiences with digital textbooks that we can bring into our courses should better prepare our teacher candidates to what seems to be their future textbook.

Future teachers will need to have at least a base experience with this new form of textbook, and unlike how the first printed books got into the classroom, this time we will not have a 300 year turnover time (Lockard, Abrams, & Many 1997). Teacher candidates need a variety of experiences to prepare them for their future classroom. While not all schools are using digital versions of texts, it does seem that as technology expands into
more educational areas, one area that can be easily adapted is that of presenting text. In my own educational technology classes I use digital textbooks at both the graduate and undergraduate levels.

In my undergraduate Introduction to Technology for Educators class I even have them do an activity similar to what I used to do with my middle schoolers and their science textbooks: the "getting to know your textbook" activity (see Appendix A). My students then explore their digital textbooks and start to see some of the ways that the text can be used, such as using a search function instead of an index, coping sections of the chapter into a text-to-speech program, note taking and using auto-summary tools.

Subject area K12 textbooks have long been a part of the teacher education process, and teacher candidates need to learn and have experiences of effective textbook integration along with other topics, such as reading in the content area. So while we need to have textbooks used in our teacher education programs, the budget for such texts is a dwindling one.

Campus libraries may not have the funds to purchase enough texts for all students in a course, which may only have limited use, nor may the student be able to. If we consider that a high school core subject textbooks costs approximately $100, then it would require an additional $100 for the student or an additional $3000 for the campus library for each class. Students often can't afford it as their textbooks and materials costs can add up to close to half of their tuition and fees of two-year public colleges (Rube & The State PIRGs 2005).

The costs of textbooks have had such an impact on students that the U.S. Congress has passed the Higher Education Opportunity Act (H.R. 4137) (Committee on Education and Labor 2008), which addresses textbook prices. Integrating open source digital textbooks (aka FREE) by teacher candidates then become an extremely cost effective strategy for implementation as well a preparatory activity for their future classroom design.

The shift to virtual or digital textbooks is expected to start at the PK12 level, with high schools and middle schools leading, then moving into the elementary school. There are a number of elementary texts already available, but these are usually story or basic literacy based books, not textbooks. This shift to digital textbooks will most likely start here because public PK12 educational schools, or school districts are responsible for the purchase of textbooks for students.

California is estimating that it could save the state 400 million dollars a year by switching to open source digital textbooks (COSTP 2002). The average high school textbook costs about $75 to $100 per student. California estimates then that a school district with approximately 10,000 high school students could save up to $2 million dollars by using open source digital textbooks in just two subjects (science and math) (CAOG 2009).

Already, a number of schools and districts have gone digital. Arizona's Empire High School was one of the first U.S. public schools to change to electronic textbooks in 2004 (Murray 2004). Since then, K12 electronic textbook uses has been expanding. According to the 2006 Project Tomorrow NetDay survey, it was found that 22% of students in middle and high school were already using electronic versions of textbooks (Evans 2007). In California,
Person Publishing, contracted to supply 45% of state school districts with digital versions of their history texts (Censky 2007).

Many schools today do not have sufficient technology resources to provide digital access for every student in school to have access to a digital text in every class. But today the $100 laptop is now a reality (Bertolucci 2009). Such a cost effective tool should soon become one of a few available at that price, and later many. At that price the cost of a laptop for a student to use is relatively the real same as the cost of a single copy of a standard biology text for high school, for example Kenneth Miller and Joseph Levine's Prentice Hall Biology is $112.15 from Amazon.com.

The laptop would also provide to the student a wealth of other applications beyond being just a digital textbook, including word processing, test taking, and digital storytelling. Even if the schools don't have the one-to-one computing capabilities yet, schools could still save money by becoming their own publishing institutions and printing out textbooks at a fraction of the cost of a traditional bound textbook.

**Conclusion**

My suggestion to all teacher educators is to search the currently available open source, free digital textbook collections, or textbook publishing house samples and find textbooks that can be incorporated now into classes, such as in methods classes (see samples below). That would make entire sets of textbooks then freely available for our teacher candidates to start using, giving them access to textbooks that also prepare them for their future classroom.

Course instructions should also guide the student in seeing the possibilities of this next textbook design, show them how such a text could be adapted for text-to-speech, digital note taking, and adaptation for differentiated instruction. For example with an open source textbook a teacher could copy the chapter into Microsoft Word, and then use the auto summary tool to create different versions of the text at the 25-33% and 50-66% size range, providing to students alternate versions of the textbook chapter from "just the facts," or the facts and supporting material levels, but without the extra detail, to the full chapter.

This is an important thing to do as part of an effort to break the "I teach as I was taught" cycle and only think of textbooks as the large paper-bound collections. Future teachers need to begin thinking and using a variety of textbooks to better prepare them for their own future classrooms.
K12 textbook Sources

- CK12: http://ck12.org/flexr/
  36 texts including Science, Math, and Social Science
  Over thirty books including science, math, social science, foreign language and language arts, from elementary to college levels.
- Community College Consortium for Open Education Resources:
  http://oerconsortium.org/discipline-specific/
  Over 300 open textbooks in a variety of subject areas.
  Nine high school texts for physics, chemistry and math
- The Orange Grove, Florida K20 Digital Repository: http://www.theorangegrove.org/
  Over 100 open source textbooks, web-books and more.
- Curriki: http://www.curriki.org/
- Global Text Project: http://globaltext.terry.uga.edu/home
- Community College Open Textbook Collaborative
  http://collegeopentextbooks.org/textbooks/textbooksbysubject.html
- Pearson Publishing sample texts:
  http://www.pearsonschool.com/live/customer_central/microsite/cafreelearning/

Other textbooks sites are focused on a single text:

- Digital History: Our Online American History Textbook:
  http://www.digitalhistory.uh.edu/database/hyper_titles.cfm
- Motion Mountain Physics: http://www.motionmountain.net/
- COSTP World History Project:
  http://en.wikibooks.org/wiki/COSTP_World_History_Project
- Understanding Algebra: http://www.jamesbrennan.org/algebra/
- Online Statistics: An Interactive Multimedia Course of Study:
  http://onlinestatbook.com/index.html
- Smarthistory (western art history textbook): http://smarthistory.org/

As an Educational Technology instructor I also use open source textbooks with my classes. Some to consider for educational technology or other general classes:

- Education for an Information Age: Teaching in the Computerized Classroom:
  http://www.pitt.edu/~edindex/InfoAge6frame.html
- Educational Technology Open Source Textbook: http://integratetech.net/contents
- Education for a Digital World:
- Handbook of Emerging Technologies for Learning:
- Introduction to Information Literacy in the K12 Classroom:
  http://en.wikibooks.org/wiki/Introduction_to_Information_Literacy_in_the_K12_Classroom
- Utilizing Technology for Meaningful Learning:
References:


Appendix A
Getting To Know Your Digital Textbook

AUTHOR: Terence Cavanaugh

GRADE LEVEL: College

OVERVIEW: Familiarize the student (teacher candidate) with the digital textbook. Once they are familiar with digital text it should enable them to be better prepared for more efficient learning and better prepared for when they will teach with digital texts.

PURPOSE: Familiarize the students with the textbook for more efficient learning and teaching.

OBJECTIVE(s):
1. Identify structures and abilities related to digital textbooks
2. Identify the reading and learning components in the textbook.
3. Provide practical experience in using the structure, design, and tools of digital textbooks for more effective learning.

RESOURCES/MATERIALS:
Teacher materials: Digital textbook, computer, digital projector
Student Materials: Digital textbook, worksheet (digital or hard copy – if hard copy then also pen, and/or pencil)

ACTIVITIES AND PROCEDURES:
1. The students will review the standard features as well as the features unique to Educational Technology Open Source Textbook (http://integratetech.net/contents).
2. Discussion question (Project on the overhead and save the answers.) Possibly use concept mapping software to record answers.
   Question: What are the standard features found in MOST printed textbooks?
   Possible answers:
   a. Table of Contents
   b. Captions
   c. Title pages
   d. Chapter introductions
   e. Glossary
   f. Index
   g. Headings
   h. Chapter Review or Summary
3. Distribute Activity Sheet "Getting to Know My Textbook" or access the question set through online form or quiz tool. This will be an in class assignment.
4. Closure Discussion Question: This is to be done after the worksheet questions have been answered (Project the list of standard features on the overhead.)
   Question: What features did you find that are unique to this digital version of a textbook?
5. Review the questions and answers the students have completed.
Activity: **Getting To Know My Digital Textbook**

Textbooks are a special kind of publication. Teachers use textbooks directly to teach their classes and a good teacher will use a textbook and create or find new information to supplement the text. Everyone is usually familiar with a textbook for their class, but textbooks exist in a number of different forms, so while you may be very familiar with the printed version, you may have had limited experience with digital textbooks.

DIRECTIONS: You are going to take a quick exploration through your digital textbook. Read each statement and follow the directions.

1. Look at the CONTENTS page (http://integratetech.net/contents) and select your LEAST favorite section. (Write the name down.)

   ____________________________________________

2. Look at the CONTENTS page (http://integratetech.net/contents) and select a CHAPTER or Section that you would like to know more about. (Write the name down.)

   ____________________________________________

3. Go to the *Technology for Meaningful Learning* section in the book, and locate the subsection on *What is Meaningful Learning*. What reason is given for why there should be a use of technology in elementary schools?

   ____________________________________________
4. Next travel to the **Middle** school section and find the link for the National Educational Technology Standards. Follow the link and find out who is responsible for the National Educational Technology Standards: ________________________________

5. Next, return to the textbook and search the chapter (ctrl-f) for the term “Bloom” and then visit each occurrence. What are three of the higher levels of Bloom’s Taxonomy?

____________________________________________________________________

6. Go to the bottom of the page and select the link to go to the next chapter **Information Literacy**. What is “Starfall”?

____________________________________________________________________

7. When choosing technology to use in the learning process, teachers need to be certain that the technology does not do what?

____________________________________________________________________

8. Find the link for the Education Pod Network; follow the link and what kind of files are available for playing?

____________________________________________________________________

Go though the menu list on the left side of the EPN and play one of the grade level or subject specific files for yourself.
9. Return to the Information Literacy chapter and go to the section on Choosing Appropriate Technology Tools for teaching and Learning. What did Professor Bell create to assist teachers?

___________________________________________________________________

10. Looking at the tool that Professor Bell created, look at the Technology Integration section, at what level do you feel that this activity that you are doing is?

___________________________________________________________________

Answers

1. answers will vary
2. answers will vary
3. differentiation of instruction
4. ISTE, International Society for Technology in Education
5. analysis, synthesis and evaluation
6. online site that teaches ABCs
7. hinder the learning process
8. audio, podcast, or mp3
9. Technology rubric
10. Exemplary or Proficient, but answers may vary
Author Note

Terence W. Cavanaugh, Ph.D is an Associate Professor in the College of Education & Human Services at the University of North Florida, Jacksonville, Florida.

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